Geophysical Research Abstracts
Vol. 14, EGU2012-4701, 2012
EGU General Assembly 2012

Channel adjustements over the last century of the Moldova River, Romania

F.A. Chiriloaei (1), M. Radoane (2), and N. Radoane (2)
(1) University of Iasi, Romania (francisca_li@yahoo.com), (2) University of Suceava, Romania

Moldova River is a 205 km long river, right tributary of the Siret River, with the confluence close to Roman city. The most important tributaries are Moldoviţa, Suha Mică, Suha Mare, Râsca, Ozana and Topolita Rivers. The drainage basin area is 4316 km^2, a discharge of about 32.8 m^3/s and is superimposed on four lithostratigraphic units: the crystalline Mesozoic unit, the flysch unit, the molasse unit and the platform unit.
The study reach is 110 km long and is located on the external part of the Eastern-Carpathians at the contact with the Moldavian Plateau. This contact is characterised by a piedmont zone. The high rate of alluviation in this piedmont plain had a decisive role on the spatial and temporal evolution of fluvial forms and processes, expressed in the morphology of alluvial terraces in the valley bottom, the morphology of the active channel, the spatial distribution of bars and secondary channels and lateral migration rates.
The morphology of the river in the study reach is dominated by braided and wandering channel patterns. The present (2005) active channel width ranges between 700 and 1000 m. Planform changes of river features over the last 100 years were analyzed on three historical maps (1910, 1960, and 1980) and one orthophoto (2005).
Channel width average has significantly decreased in the last century. The Moldova river channel width suffered a strong narrowing, approximately 76% (from 1910 to 2005). So, from a channel width about more than 1200 m, it decreased at about 300 m. We can note two phase of narrowing: a first one - stronger, of 56%, untill 1960 (a reduction of active channel width for about 10.5 m/year) and a second phase, of 35%, after 1960, with a narrowing rate for about 8.8 m/an.
The historical trend of braiding index shows a remarkable decrease in the last 50 - 60 years, from 3.2 in 1960, at 2.6 in 1980 and 2.0, in 2005, for all the extra-Carpathian study reach (110 km). There are different situations at local scale, shown using the sectorial analysis.
The rates of channel incision were estimated by analyzing the lowest annual stage of the Moldova River, in 4 gauging stations. Along the river, the incision rate (absolute values) increase from - 80 cm (at the exit of mountain area) to - 2.60 m at the confluence with Siret River. In terms of human impact, in-channel gravel mining and local embankments near bridges and towns are the most important direct interventions along the channel. Besides the direct effect of channelization on channel morphology, the major effect of human actions was on sediment regime. A significant decrease of in-channel sediment supply was determined by gravel mining. On the other hand, channel-forming discharges did not undergo significant changes in most of the study streams.
It is obvious that, channel with narrowed considerably, river flow concentrated, therefore, the number of channels (links) reduced (from maximum 10, in 1960, to maximum 8 in 1980 and approximately 5, in 2005). In this period, some reaches changed their typology from braided reaches to wandering reaches.